



STK4044XI

AF Power Amplifier (Split Power Supply) (100 W min, THD = 0.008 %)

Features

- Compact packaging supports slimmer set designs
- Series designed from 50 up to 150 W and pin-compatibility
- Simpler heat sink design facilitates thermal design of slim stereo sets
- Current mirror circuit, cascade circuit and pure-complimentary circuit application reduce distortion to 0.008 %
- Supports addition of electronic circuits for thermal shutdown and load-short protection circuit as well as pop noise muting which occurs when the power supply switch is turned on and off.

Specifications

Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---------------------------------|---------------------|---|-------------|------|
| Maximum supply voltage | V _{CC} max | | ± 74 | V |
| Thermal resistance | θ _{j-c} | | 1.2 | °C/W |
| Junction temperature | T _J | | 150 | °C |
| Operating substrate temperature | T _c | | 125 | °C |
| Storage temperature | T _{stg} | | -30 to +125 | °C |
| Permissible load short time | t _s *1 | V _{CC} = ± 51 V, R _L = 8 Ω, f = 50 Hz, P _O = 100 W | 1 | s |

Recommended Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------------------|-----------------|------------|---------|------|
| Recommended supply voltage | V _{CC} | | ± 51 | V |
| Load resistance | R _L | | 8 | Ω |

Operating Characteristics

at Ta = 25°C, V_{CC} = ± 51 V, R_L = 8 Ω, V_G = 40 dB, R_g = 600 Ω, 100 kHz LPF ON, R_L (noninductive)

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---------------------------|---------------------------------|--|---------|-----------|-------|-------|
| | | | min | typ | max | |
| Quiescent current | I _{CCQ} | V _{CC} = ± 61.5 V | 15 | | 120 | mA |
| Output power | P _O | THD = 0.008 %, f = 20 Hz to 20 kHz | 100 | | | W |
| Total harmonic distortion | THD | P _O = 1.0 W, f = 1 kHz | | | 0.008 | % |
| Frequency response | f _L , f _H | P _O = 1.0 W, ± 0 dB -3 | | 20 to 50k | | Hz |
| Input resistance | r _i | P _O = 1.0 W, f = 1 kHz | | 55 | | kΩ |
| Output noise voltage | V _{NO} *2 | V _{CC} = ± 61.5 V, R _g = 10 kΩ | | | 1.2 | mVrms |
| Neutral voltage | V _N | V _{CC} = ± 61.5 V | -70 | 0 | + 70 | mV |

Note: Use rated power supply for test unless otherwise specified.

*1. When measuring permissible load short time and output noise voltage use transformer power supply indicated next page.

*2. Output noise voltage represents the peak value on the rms scale (VTVM). The noise voltage waveform does not include the pulse noise.

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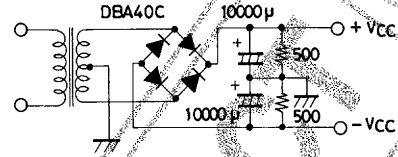
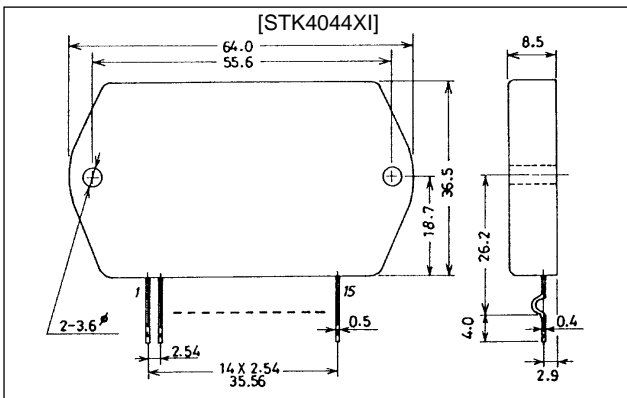
SANYO Electric Co., Ltd. Semiconductor Business Headquarters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Package Dimensions

unit: mm

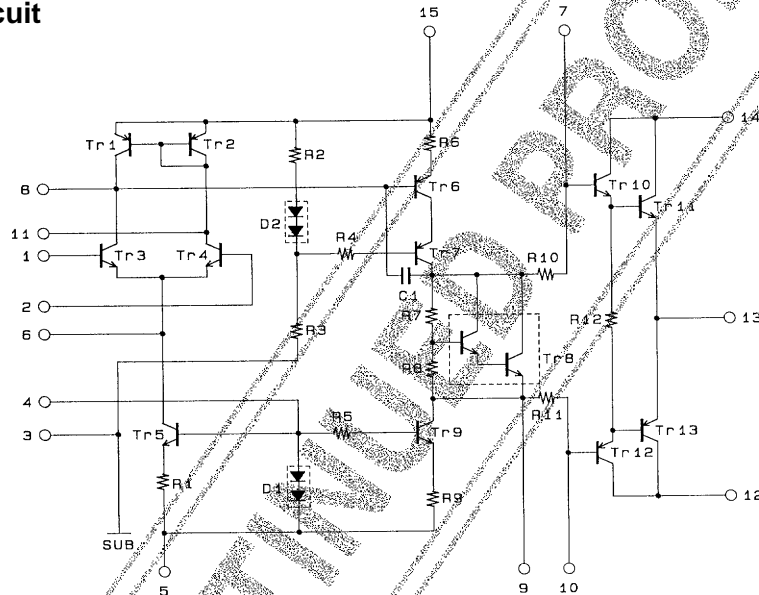
4075



Unit (resistance: Ω, capacitance: F)

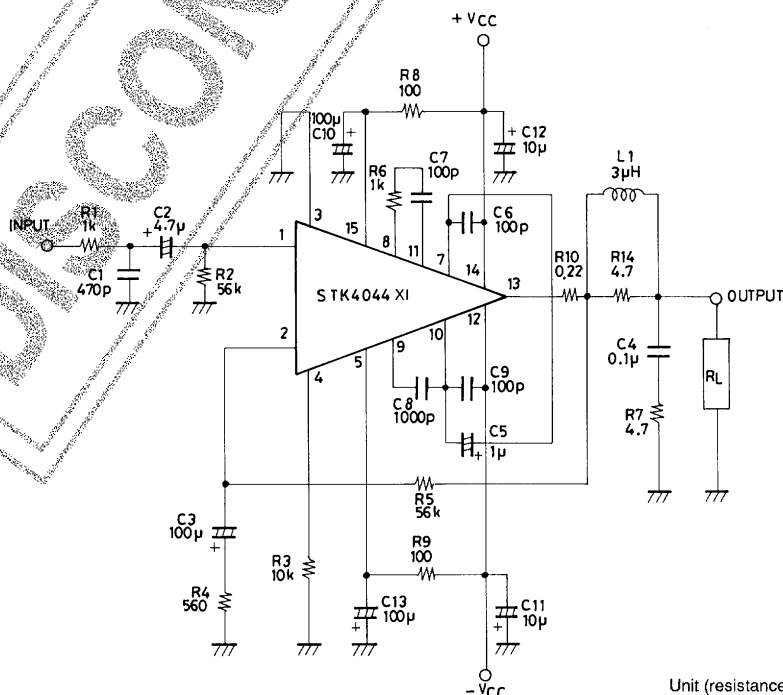
Specified Transformer Power Supply (MG-200 Equivalent)

Equivalent Circuit



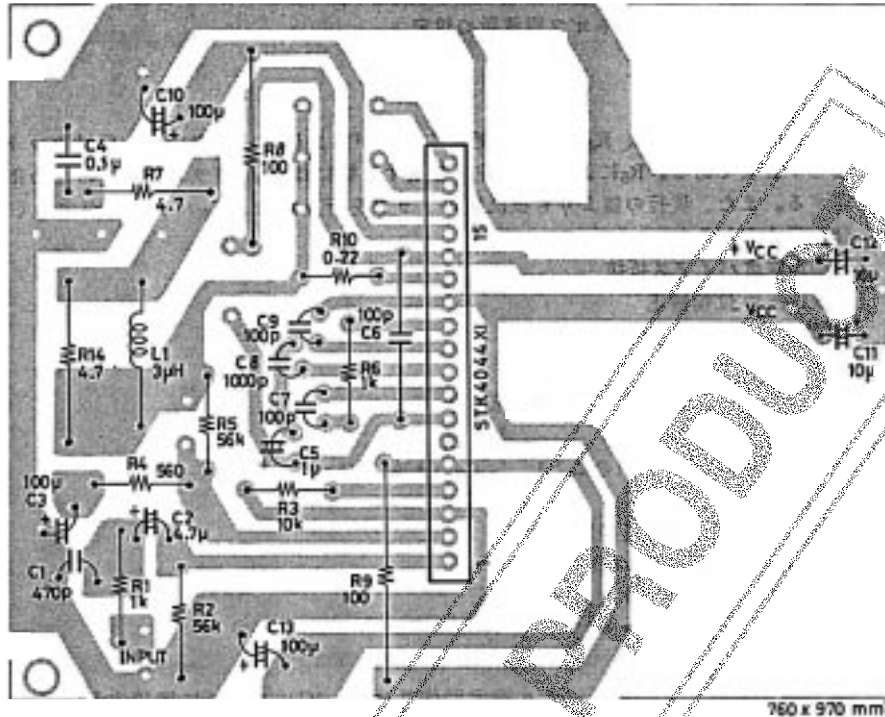
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Sample Application Circuit: 100W min Single Channel AF Power Amplifier



Unit (resistance:Ω , capacitance: F)

Sample Printed Circuit Pattern for Application Circuit (Copper-foiled side)

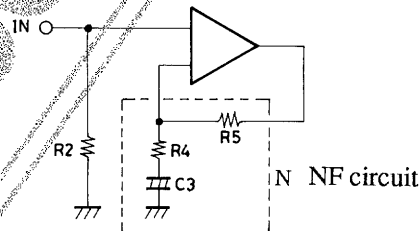


760 x 970 mm

Description of External Parts

Unit (resistance: Ω , capacitance: F)

- R_1, C_1 : Input filter circuit
 - Reduces high-frequency noise.
- C_2 : Input coupling capacitor
 - DC current suppression. A reduction in reactance is effective because of increases in capacitor reactance at low frequencies and $1/f$ noise dependence on signal source resistance which result in output noise worsening.
- R_2 : Input bias resistor
 - Biases the input pin to zero
 - Effects V_N stability (refer to NF circuit)
 - Due to differential input, input resistance is more or less determined by this resistance value.
- R_4, R_5 : NFB circuit (AC NF circuit). Use of resistor with 1% error is suggested.
- $C_3 (R_2)$



- C_3 : AC NF capacitor
- R_4, R_5 : Used for VG setting.

- VG settings are obtained using R_4 and R_5 according to the following equation:

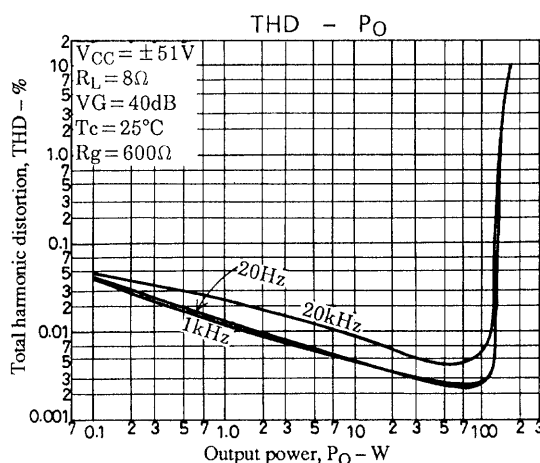
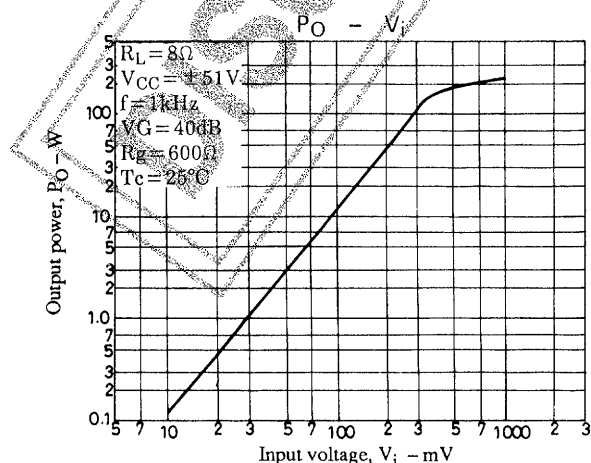
$$\log_{20} \frac{R_5}{R_4} \quad 40 \text{ dB is recommended.}$$

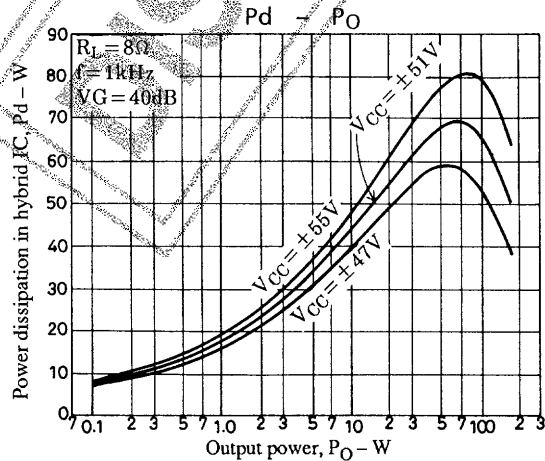
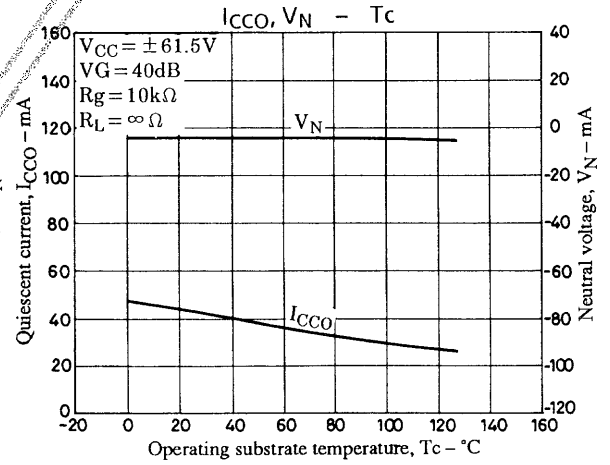
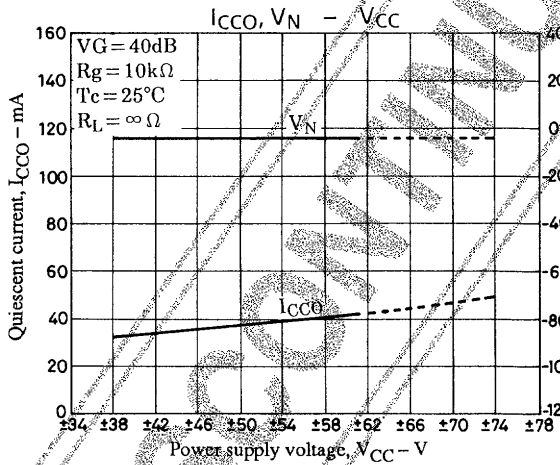
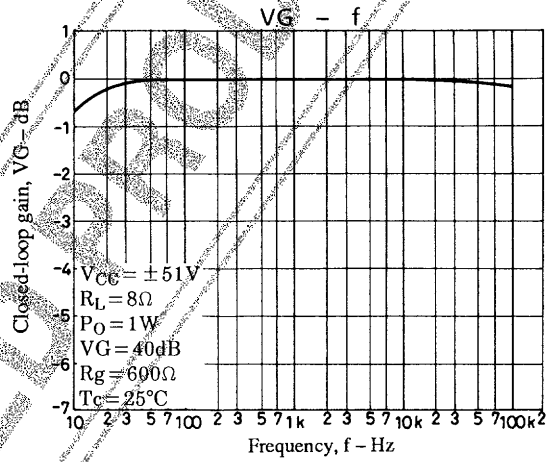
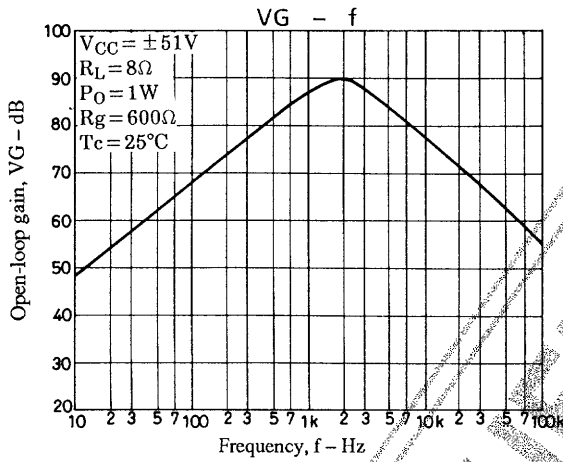
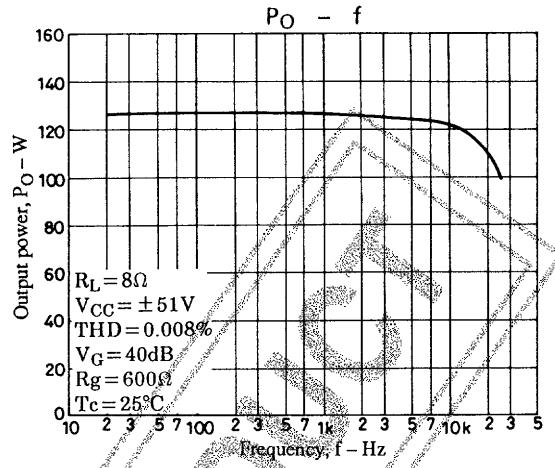
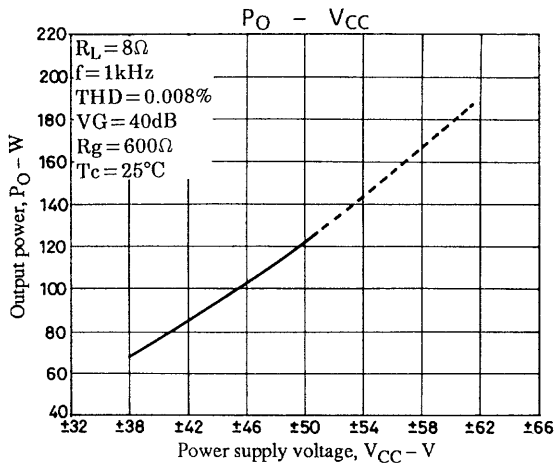
- Low-frequency cutoff frequency settings are obtained using R_4 and C_3 according to the following equation:

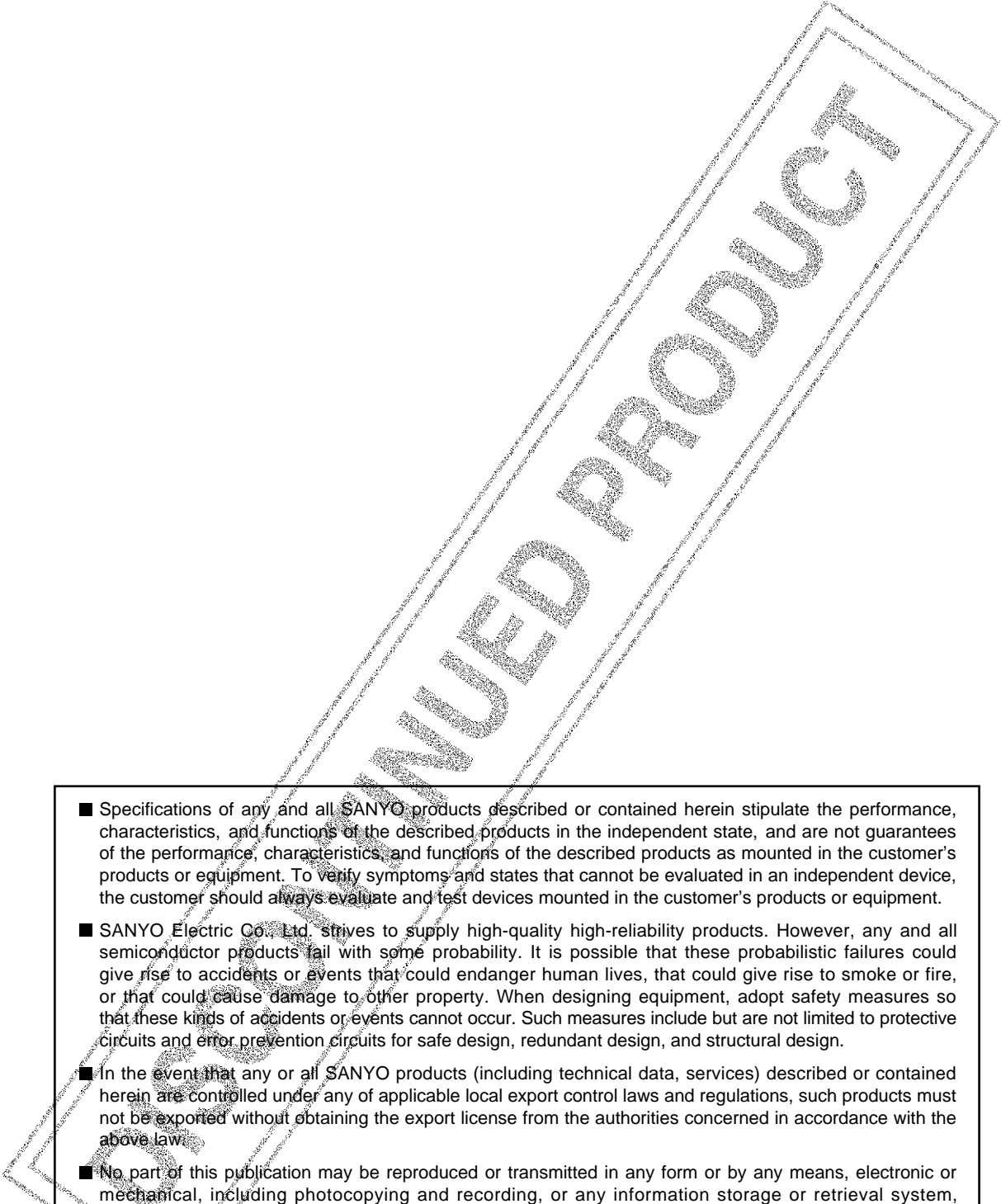
$$f_L = \frac{1}{2\pi \cdot R_4 \cdot C_3} \quad [\text{Hz}]$$

When changing the VG setting, you should change R_4 which requires a recheck of the low cutoff frequency setting. When the VG setting is changed using R_5 , the setting should ensure R_2 equals R_5 so that V_N balance stability is maintained. If the resistor value is increased more than the existing value, V_N balance may be disturbed and result in deterioration of V_N temperature characteristics.

- R_3 : Differential constant-current bias resistor
- R_6, R_7 : For oscillation suppression and phase compensation applications
(For use with differential stage applications)
- R_7, C_4 : For oscillation suppression and phase compensation applications
(A Mylar capacitor is recommended for C_4 for use with output stage applications)
- C_6, C_9 : For oscillation suppression and phase compensation applications
Power stage (Must be connected near the pin) C_6 : Positive (+) power C_9 : Negative (-) power
- C_8 : For oscillation suppression and phase compensation applications
(Oscillation suppression before power step clip)
- C_5 : For oscillation suppression and distortion improvement applications
- R_8, C_{10} : Ripple filter circuit on positive (+) side.
- R_9, C_{13} : Ripple filter circuit on negative (-) side.
- C_{11}, C_{12} : For oscillation suppression applications
 - Used for reducing power supply impedance to stable IC operation and should be connected near the IC pin. We recommend that you use an electrolytic capacitor.
- R_{10} : Output resistor
Increases load shorting endurance capacity during times of high output.
- R_{14}, L_1 : For oscillation suppression applications
Increases oscillation stability against capacitance loads.





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